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| **SEMESTER** | **:** | MARCH – AUGUST 2023 |
| **COURSE** | **:** | Image processing |
| **COURSE CODE** | **:** | **CSC566** |
| **PROJECT TITLE** | **:** | **Tomato Leaf Disease Classification using**  **“put your selected technique here”** |
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| **Group:** |  |
| **Name, Student ID, Class:** | 1. |
|  | 2. |
|  | 3. |
|  | 4. |
|  | 5. |
| **Lecturer Name:** |  |

**ASSESSMENT**

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| **ITEMS** | **FULL MARKS** | **MARKS** |
| **PRESENTATION:**   1. Project completeness and complexity 2. Content of presentation 3. Delivery skills | **30** |  |
| **REPORT:**   1. Introduction 2. Objectives 3. Data Collection    1. Training dataset    2. Testing dataset 4. Flowchart 5. Model architecture 6. Input 7. Process 8. Output 9. Sample input and output 10. Source Code 11. Test and Evaluation 12. Accuracy rate 13. Learning rate 14. Error rate 15. Recall 16. Precision 17. Conclusion   References | **70** |  |
| **PENALTY** |  |  |
| **TOTAL MARKS** | **100** |  |

**TASK: TOMATO LEAF DISEASE CLASSIFICATION**

1. Please refer to this link for image dataset: https://www.kaggle.com/datasets/cookiefinder/tomato-disease-multiple-sources

Download the image dataset folder and choose at least **THREE (3)** different tomato leaf disease classes.

1. The example images are as follows:

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| Bacterial Spot | Leaf Mold | Spider Mites |

1. Notice that each image contains different information, which can be utilized in order to classify the leaves into the three classification of diseases.
2. Perform any deep learning method (using Python) to classify the tomato leaf disease. The sample of steps could be followed from these videos (or any other resources):
   1. <https://www.youtube.com/watch?v=iGWbqhdjf2s>
   2. <https://www.youtube.com/watch?v=jztwpsIzEGc>
   3. <https://www.youtube.com/watch?v=J1jhfAw5Uvo>
3. Then, evaluate the accuracy rate for training and testing dataset.
4. Write a report by using the **INSTRUCTIONS** below.

**INSTRUCTIONS**

1. Use the project cover sheet as provided (**page 1 and 2**).
2. This is a group project. Each group consists of **3-5 members**.
3. General format:
   1. Font: Arial (for report) and Courier New (for source code)
   2. Font size: 11
   3. Table, Figure: Arial, 9
   4. Spacing: 1.15 (for report) and 1.0 (source code)
4. Special remarks:
   1. No marks will be given for late submission
   2. Any copied project (with NO EXCEPTION) will be given 0 (zero) mark.
5. Link for submission (p/s: please create your own group folder in the specific class folder):

<https://drive.google.com/drive/folders/1S6i1H6ALqyiMhiAttY3n1JsD67YWAGZz?usp=sharing>

1. The submission should include:
   1. Recorded video presentation (for report and system demo)
   2. Report (.pdf file)
   3. System (.zip file)
   4. Dataset
2. Due date: **Wednesday, 12th July 2023, 6pm**.

**ASSESSMENT INFORMATION**

**PRESENTATION (30 MARKS)**

Presentation marks will be given based on the following criteria:

1. Project completeness and complexity
2. Content of presentation
3. Delivery skills

**REPORT (70 MARKS)**

For this mini project, you are required to experiment and write a program on the given topics using Python. Your project report should follow the requirements based on the given format. Include a report based on the format below:

1. **Project report cover**

As provided in page 1 – 2.

1. **Table of content**

As provided in page 2 – 3.

1. **Introduction**

Describe about the given project which reflect to your project title.

1. **Objectives**

Describe about the objectives of the project.

1. **Data Collection**

Describe and specify the total number of training and testing images that have been used, and the sources conducted for experimental data. The minimum dataset for training and testing images is **1000 images**.

You can use the ratio of training : testing = 70 : 30 or 80 : 20 or 90 : 10.

How to choose the best ratio?

It is based on the best results produced from your experiment based on the above ratio. You can also refer to papers and journals.

1. **Flowchart**

Explain and describe the flowchart or process flow of the methodology used in the experiment. The selected methods are based on the technique used in your experiment. Use and experiment the same flowchart and methods (source code) for all images.

1. **Methods**

Explain and describe all the methods involved during the project.

**Example:**

**Machine Learning or Deep Learning Architecture**

Explain all the processes involved in this architecture for each layer during your experiments.

1. Input
2. Feature extraction layer
3. Classification layer
4. Output
5. Sample input and output
6. **Source Code**

Write source code with proper comments.

1. **Test and Evaluation**
2. Accuracy rate
3. Learning rate
4. Error rate
5. Recall
6. Precision

The submitted report must be included all the processes (original image, process 1 until the last process, output) involved. The source code should work for all image datasets. All results must construct in the table. Discuss all the findings of the learning rate, accuracy rate and error rate.

Summarize and conclude all the findings from the experiments. Then, describe the future works.

1. **References**

Minimum references are 15 conference or journal papers.

**ASSESSMENT RUBRIC**

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| **RUBRIC** | **EXCELLENT (8 – 10)** | **GOOD (6 – 7)** | **SATISFACTORY (5)** | **POOR (1 – 4)** | **0** |
| **PRESENTATION**  **(30 MARKS)**   1. Project completeness and complexity 2. Content of presentation 3. Delivery skills | * High level of completeness and complexity achieved in solving the problem. * Presenter has a smooth presentation flow and provides good explanations and/or elaboration, used time wisely. | * Moderate level of completeness and complexity achieved in solving the problem. * Presenter provides explanations and/or elaboration, used time wisely. | * Fair level of completeness and complexity achieved in solving the problem. * Presenter provides explanations and/or insufficient elaboration and use of time. | * Poor level of completeness and complexity achieved in solving the problem. * There is no presentation flow. Goes over time limit or does not fully cover the topics. | No attempt. |
|  | | | | | |
| **REPORT**  **(70 MARKS)**   1. Introduction 2. Objectives and Project Significance 3. Data Collection 4. Flowchart 5. Model architecture 6. Source Code 7. Test and Evaluation 8. Conclusion   References | * Working title that clearly reflects the project. * Objectives - highly reflect the elements: specific, measurable, achievable, realistic and timeliness. * Highly reflects the following elements: approach, methods, design and deliverables. * Comprehensive examination and explanation of the interaction between parameters and system function in the development. * Comprehensive discussion of the result is articulated in an excellent manner. | * Working title that reflects the project. * Objectives - clearly reflect the elements: specific, measurable, achievable, realistic and timeliness. * Clearly reflects the following elements: approach, methods, design and deliverables. * Detailed examination and explanation of the interaction between parameters and system function in the development. * Detailed discussion of the result is articulated in a well manner. | * Appropriate working title that reflects the project. * Objectives - adequately reflect the elements: specific, measurable, achievable, realistic and timeliness. * Adequately reflects the following elements: approach, methods, design and deliverables. * Appropriate examination and explanation of the interaction between parameters and system function in the development. * Appropriate discussion of the result is articulated in a good manner. | * Inappropriate working title that reflects the project. * Objectives – does not reflect the elements: specific, measurable, achievable, realistic and timeliness. * Poorly reflects the following elements: approach, methods, design and deliverables. * Incomplete examination and explanation of the interaction between parameters and system function in the development. * Incomplete discussion of the result is articulated. | No attempt. |
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**ALL THE BEST STUDENTS!**